APPENDIX E

Description and Use of RCRA Biennial Report Data

The RCRA Biennial Report System is a national system that collects data on the generation and management of hazardous waste and is required by regulations implementing the Resource Conservation and Recovery Act (RCRA) of 1976, as amended by the Hazardous and Solid Waste Amendments of 1984 (HSWA). The BRS captures data on two groups of RCRA-regulated hazardous waste handlers: non-household Large Quantity Generators, and Treatment, Storage, and Disposal facilities (TSDs). These facilities must submit a report every other year detailing the quantities, composition, and characteristics of generated hazardous waste, the methods used to manage the hazardous wastes, and the efforts taken to reduce the volume and toxicity of hazardous wastes. BRS data exist for odd-numbered years; 1993 is the latest year for which BRS data were available when the data for this report were compiled.

Information collected for the BRS is organized into five groups of databases, each group corresponding to a different form submitted by reporting facilities.

- **Form IC - Identification and Certification.** This form must be submitted by all facilities required to file a biennial report and contains basic identification information for each facility.

- **Form GM - Waste Generation and Management.** This form must be submitted by all facilities required to file a biennial report that generated or shipped any quantity of RCRA hazardous waste. A separate and independent Form GM must be submitted for each RCRA hazardous waste. The Form GM and its corresponding databases contain information regarding the type and quantity of waste generated or shipped as well as the management methods used in the treatment, storage, disposal, or recycling of the waste.

- **Form WR - Waste Received From Off-Site.** This form must be submitted by all facilities required to file a biennial report that received RCRA hazardous waste from off-site (including waste from all facilities, not just Large Quantity Generators and TSDs). The Form WR and its corresponding databases include the type and quantity of each waste received, the source of the waste, and the management method used in treating, disposing, or recycling the waste.

- **Form PS - On-Site Waste Treatment, Disposal, or Recycling Process System.** This form must be submitted by all facilities required to file a biennial report for each on-site hazardous waste treatment, disposal, or recycling process system that existed, was planned, or was in the closure process during the reporting year. This information includes the regulatory status of the system, the units comprising the system, the components of the system, and the demand placed on the system.

- **Form OI - Off-Site Identification.** This form is submitted by facilities required to file a biennial report that received hazardous waste from off-site or sent hazardous waste off-site. Form OI is not required by EPA; each state decides whether to require this form.

To collect information for the universe of assembly plants, the Project Team searched four of the "GM Form" databases ("Flat Files" G1, G2, G5 and G6) using the EPA identification number assigned to each facility by the RCRA program. The "GM Form" contains EPA hazardous waste codes, management system type (both on- and off-site), the quantity of waste generated and managed, waste source, and waste physical form. All of the waste codes, source codes, waste form codes, and management system codes used are attached at the end of this appendix.

In the analysis of BRS data in Part I of this report (pages I-26 through I-30), distinction is made between aqueous and non-aqueous waste. Guidelines used by EPA's Office of Solid Waste to define waste water treatment were applied to determine whether a waste is aqueous or non-aqueous. For this report, a waste was classified as aqueous if: 1) its waste form code is B101, B102, B105 or B110-B116, **or** (where a waste form is not specified) 2) its management system code is M071-M079, M081-M085, M089, M091-M094, M099, M121-M125, M129, M134-M136 and the waste is generated in quantities greater than 50 tons. All wastes not meeting these criteria were classified as a non-aqueous waste. In a few cases, auto company reviewers provided additional information on the physical form of specific wastes.

There are a few things to bear in mind when using the BRS data. First, the BRS database is not updated once it is publicly available (unlike the TRI database). This means that inaccuracies may have been identified and have not been corrected. Second, facilities have the option of reporting waste quantities in seven different units of measurement. To aggregate and compare quantities, it is therefore necessary to convert all quantities to one standard unit of measurement (in this report, tons). Methods used to convert quantities reported in other units to tons is provided later in this appendix. Third, it is not possible to derive concentration data for each constituent in a wastestream. Each wastestream in the BRS may be identified by multiple waste codes, indicating different types of hazardous properties or constituents, but there is no way to assess the concentration of an individual toxic constituent or the mixture ratios of multiple constituents. Two wastes generated in the same quantity may therefore present different types of hazard and may contain very different quantities of toxic constituents.

Attachment E-1

EPA HAZARDOUS WASTE CODES

Code	Waste description
CHARACTERISTICS OF HAZARDOUS WASTE	
D001	Ignitable waste
D002	Corrosive waste
D003	Reactive waste
D004	Arsenic
D005	Barium
D006	Cadmium
D007	Chromium
D008	Lead
D009	Mercury
D010	Selenium
D011	Silver
D012	Endrin(1,2,3,4,10,10-hexachloro-1,7-epoxy-1,4,4a,5,6,7,8,8a-octahydro-1,4-endo, endo-5,8-dimeth-ano-naphthalene)
D013	Lindane (1,2,3,4,5,6-hexa-chlorocyclohexane, gamma isomer)
D014	Methoxychlor (1,1,1-trichloro-2,2-bis [p-methoxyphenyl] ethane)
D015	Toxaphene (C_{10} H_{10} Cl_8, Technical chlorinated camphene, 67-69 percent chlorine)
D016	2,4-D (2,4-Dichlorophenoxyacetic acid)
D017	2,4,5-TP Silvex (2,4,5-Trichlorophenoxypropionic acid)
D018	Benzene
D019	Carbon tetrachloride
D020	Chlordane
D021	Chlorobenzene
D022	Chloroform
D023	o-Cresol
D024	m-Cresol
D025	p-Cresol
D026	Cresol
D027	1,4-Dichlorobenzene
D028	1,2-Dichloroethane
D029	1,1-Dichloroethylene
D030	2,4-Dinitrotoluene
D031	Heptachlor (and its epoxide)
D032	Hexachlorobenzene
D033	Hexachlorobutadiene
D034	Hexachloroethane
D035	Methyl ethyl ketone
D036	Nitrobenzene
D037	Pentachlorophenol
D038	Pyridine

Partial list -- excludes K codes, which were not reported by assembly plants, and includes only those U and P codes reported by assembly plants in 1991 or 1993.

EPA HAZARDOUS WASTE CODES

Code	Waste description
D039	Tetrachloroethylene
D040	Trichlorethylene
D041	2,4,5-Trichlorophenol
D042	2,4,6-Trichlorophenol
D043	Vinyl chloride
	HAZARDOUS WASTE FROM NONSPECIFIC SOURCES
F001	The following spent halogenated solvents used in degreasing: Tetrachloroethylene, trichlorethylene, methylene chloride, 1,1,1-trichloroethane, carbon tetrachloride and chlorinated fluorocarbons; all spent solvent mixtures/blends used in degreasing containing, before use, a total of ten percent or more (by volume) of one or more of the above halogenated solvents or those solvents listed in F002, F004, and F005; and still bottoms from the recovery of these spent solvents and spent solvent mixtures.
F002	The following spent halogenated solvents: Tetrachloroethylene, methylene chloride, trichloroethylene, 1,1,1-trichloroethane, chlorobenzene, 1,1,2-trichloro-1,2,2-trifluoroethane, ortho-dichlorobenzene, trichlorofluoromethane, and 1,1,2, trichloroethane; all spent solvent mixtures/blends containing, before use, a total of ten percent or more (by volume) of one or more of the above halogenated solvents or those solvents listed in F001, F004, and F005; and still bottoms from the recovery of these spent solvents and spent solvent mixtures.
F003	The following spent non-halogenated solvents: Xylene, acetone, ethyl acetate, ethyl benzene, ethyl ether, methyl isobutyl ketone, n-butyl alcohol, cyclohexanone, and methanol; all spent solvent mixtures/ blends containing, before use, only the above spent nonhalogenated solvents; and all spent solvent mixtures/blends containing, before use, one or more of the above nonhalogenated solvents, and a total of ten percent or more (by volume) of one or more of those solvents listed in F001, F002, F004, and F005; and still bottoms from the recovery of these spent solvents and spent solvent mixtures.
F004	The following spent nonhalogenated solvents: cresols, cresylic acid, and nitrobenzene; and the still bottoms from the recovery of these solvents; all spent solvent mixtures/blends containing, before use, a total of ten percent or more (by volume) of one or more of the above nonhalogenated solvents or those solvents listed in F001, F002, and F005; and still bottoms from the recovery of these spent solvents and spent solvent mixtures.
F005	The following spent nonhalogenated solvents: toluene, methyl ethyl ketone, carbon disulfide, isobutanol, pyridine, benzene, 2-ethoxyethanol, and 2-nitropropane; all spent solvent mixtures/blends containing, before use, a total of ten percent or more (by volume) of one or more of the above nonhalogenated solvents or those solvents listed in F001, F002, or F004; and still bottoms from the recovery of these spent solvents and spent solvent mixtures.
F006	Wastewater treatment sludges from electroplating operations except from the following processes: (1) sulfuric acid anodizing of aluminum; (2) tin plating on carbon steel; (3) zinc plating (segregated basis) on carbon steel; (4) aluminum or zinc-aluminum plating on carbon steel; (5) cleaning/stripping associated with tin, zinc, and aluminum plating on carbon steel; and (6) chemical etching and milling of aluminum.

Partial list -- excludes K codes, which were not reported by assembly plants, and includes only those U and P codes reported by assembly plants in 1991 or 1993.

EPA HAZARDOUS WASTE CODES

Code	Waste description
F007	Spent cyanide plating bath solutions from electroplating operations.
F008	Plating bath residues from the bottom of plating baths from electroplating operations in which cyanides are used in the process.
F009	Spent stripping and cleaning bath solutions from electroplating operations in which cyanides are used in the process.
F010	Quenching bath residues from oil baths from metal heat treating operations in which cyanides are used in the process.
F011	Spent cyanide solutions from slat bath pot cleaning from metal heat treating operations.
F012	Quenching wastewater treatment sludges from metal heat treating operations in which cyanides are used in the process.
F019	Wastewater treatment sludges from the chemical conversion coating of aluminum except from zirconium phosphating in aluminum can washing when such phosphating is an exclusive conversion coating process.
F020	Wastes (except wastewater and spent carbon from hydrogen chloride purification) from the production or manufacturing use (as a reactant, chemical intermediate, or component in a formulating process) of tri- or tetrachlorophenol or of intermediates used to produce their pesticide derivatives. (This listing does not include wastes from the production of hexachlorophene from highly purified 2,4,5-trichlorophenol.)
F021	Wastes (except wastewater and spent carbon from hydrogen chloride purification) from the production or manufacturing use (as a reactant, chemical intermediate, or component in a formulating process) of pentachlorophenol, or of intermediates used to produce derivatives.
F022	Wastes (except wastewater and spent carbon from hydrogen chloride purification) from the manufacturing use (as a reactant, chemical intermediate, or component in a formulating process) of tetra-, penta-, or hexachlorobenzenes under alkaline conditions.
F023	Wastes (except wastewater and spent carbon from hydrogen chloride purification) from the production of materials on equipment previously used for the production or manufacturing use (as a reactant, chemical intermediate, or component in a formulating process) of tri- and tetrachlorophenols. (This listing does not include wastes from equipment used only for the production or use of hexachlorophene from highly purified 2,4,5-trichlorophenol.)
F024	Process wastes including, but not limited to, distillation residues, heavy ends, tars, and reactor clean-out wastes, from the production of certain chlorinated aliphatic hydrocarbons by free radical catalyzed processes. These chlorinated aliphatic hydrocarbons are those having carbon chain lengths ranging from one to and including five, with varying amounts and positions of chlorine substitution. (This listing does not include wastewaters, wastewater treatment sludge, spent catalysts, and wastes listed in Sections 261.31. or 261.32)
F025	Condensed light ends, spent filters and filter aids, and spent desiccant wastes from the production of certain chlorinated aliphatic hydrocarbons, by free radical catalyzed processes. These chlorinated aliphatic hydrocarbons are those having carbon chain lengths ranging from one, to and including five, with varying amounts and positions of chlorine substitution.

Partial list -- excludes K codes, which were not reported by assembly plants, and includes only those U and P codes reported by assembly plants in 1991 or 1993.

EPA HAZARDOUS WASTE CODES

Code	Waste description
F026	Wastes (except wastewater and spent carbon from hydrogen chloride purification) from the production of materials on equipment previously used for the manufacturing use (as a reactant, chemical intermediate, or component in a formulating process) of tetra-, penta-, or hexachlorobenzene under alkaline conditions.
F027	Discarded unused formulations containing tri-, tetra-, or pentachlorophenol or discarded unused formulations containing compounds derived from these chlorophenols. (This listing does not include formulations containing hexachlorophene synthesized from prepurified 2,4,5-trichlorophenol as the sole component.)
F028	Residues resulting from the incineration or thermal treatment of soil contaminated with EPA hazardous waste nos. F020, F021, F022, F023, F026, and F027.
F032	Wastewaters, process residuals, preservative drippage, and spent formulations from wood preserving processes generated at plants that currently use, or have previously used, chlorophenolic formulations [except potentially cross-contaminated wastes that have had the F032 waste code deleted in accordance with Section 261.35 (i.e., the newly promulgated equipment cleaning or replacement standards), and where the generator does not resume or initiate use of chlorophenolic formulations]. (This listing does not include K001 bottom sediment sludge from the treatment of wastewater from wood preserving processes that use creosote and/or pentachlorophenol.)
F034	Wastewaters, process residuals, preservative drippage, and spent formulations from wood preserving processes generated at plants that use creosote formulations. This listing does not include K001 bottom sediment sludge from the treatment of wastewater from wood preserving processes that use creosote and/or pentachlorophenol.
F035	Wastewaters, process residuals, preservative drippage, and spent formulations from wood preserving processes generated at plants that use inorganic preservatives containing arsenic or chromium. This listing does not include K001 bottom sediment sludge from the treatment of wastewater from wood preserving processes that use creosote and/or pentachlorophenol.
F037	Petroleum refinery primary oil/water/solids separation sludge - Any sludge generated from the gravitational separation of oil/water/solids during the storage or treatment of process wastewaters and oily cooling wastewaters from petroleum refineries. Such sludges include, but are not limited to, those generated in oil/water/solids separators; tanks and impoundments; ditches and other conveyances; sumps; and storm water units receiving dry weather flow. Sludges generated in storm water units that do not receive dry weather flow, sludges generated in aggressive biological treatment units as defined in Section 261.31(b)(2)(including sludges generated in one or more additional units after wastewaters have been treated in aggressive biological treatment units), and K051 wastes are exempted from this listing.
F038	Petroleum refinery secondary (emulsified) oil/water/solids separation sludge - Any sludge and/or float generated from the physical and/or chemical separation of oil/water/solids in process wastewaters and oily cooling wastewaters from petroleum refineries. Such wastes include, but are not limited to, all sludges and floats generated in induced air flotation (IAF) units, tanks and impoundments, and all sludges generated in DAF units. Sludges generated in stormwater units that do not receive dry weather flow, sludges generated in aggressive biological treatment units as defined in Section 261.31(b)(2) (including sludges generated in one or more additional units after wastewaters have been treated in

Partial list -- excludes K codes, which were not reported by assembly plants, and includes only those U and P codes reported by assembly plants in 1991 or 1993.

EPA HAZARDOUS WASTE CODES

Code	Waste description
	aggressive biological treatment units), and F037, K048, and K051 wastes are exempted from this listing.
F039	Leachate resulting from the treatment, storage, or disposal of wastes classified by more than one waste code under Subpart D, or from a mixture of wastes classified under Subparts C and D of this part. (Leachate resulting from the management of one or more of the following EPA Hazardous Wastes and no other hazardous wastes retains its hazardous waste code(s): F020, F021, F022, F023, F026, F027, and/or F028.)
DISCARDED COMMERCIAL CHEMICAL PRODUCTS, OFF-SPECIFICATION SPECIES, CONTAINER RESIDUALS, AND SPILL RESIDUES THEREOF—ACUTE HAZARDOUS WASTE	
(AN ALPHABETIZED LISTING CAN BE FOUND AT 40 CFR 261.33.)	
P005	2-Propen-1-ol
P005	Allyl alcohol
P012	Arsenic oxide As_2O_3
P012	Arsenic trioxide
P018	Brucine
P018	Strychnidin-10-one, 2,3-dimethoxy-
P028	Benzene, (chloromethyl)-
P028	Benzyl chloride
P029	Copper cyanide
P029	Copper cyanide Cu(CN)
P059	4,7-Methano-1H-indene, 1,4,5,6,7,8,8-heptachloro-3a,4,7,7a-tetrahydro-
P059	Heptachlor
P098	Potassium cyanide
P098	Potassium cyanide K(CN)
P106	Sodium cyanide
P106	Sodium cyanide Na(CN)
DISCARDED COMMERCIAL CHEMICAL PRODUCTS, OFF-SPECIFICATION SPECIES, CONTAINER RESIDUES, AND SPILL RESIDUES THEREOF—TOXIC WASTES	
(AN ALPHABETIZED LISTING CAN BE FOUND AT 40 CFR 261.33.)	
U007	2-Propenamide
U007	Acrylamide
U051	Creosote
U052	Cresol (Cresylic acid)
U052	Phenol, methyl-
U080	Methane, dichloro-
U080	Methylene chloride
U117	Ethane, 1,1'-oxybis-(I)
U117	Ethyl ether (I)
U121	Methane, trichlorofluoro-
U121	Trichloromonofluoromethane
U122	Formaldehyde
U151	Mercury
U154	Methanol (I)
U154	Methyl alcohol (I)
U210	Ethene, tetrachloro-

Partial list -- excludes K codes, which were not reported by assembly plants, and includes only those U and P codes reported by assembly plants in 1991 or 1993.

EPA HAZARDOUS WASTE CODES

Code	Waste description	Code	Waste description
U210	Tetrachloroethylene		
U225	Bromoform		
U225	Methane, tribromo-		
U226	Ethane, 1,1,1-trichloro-		
U226	Methyl chloroform		
U240	2,4-D, salts & esters		
U240	Acetic acid, (2,4-dichlorophenoxy)-, salts & esters		
U240	Dichlorophenoxyacetic acid 2,4-D		

Partial list -- excludes K codes, which were not reported by assembly plants, and includes only those U and P codes reported by assembly plants in 1991 or 1993.

SOURCE CODES

Code	Waste source
CLEANING AND DEGREASING	
A01	Stripping
A02	Acid cleaning
A03	Caustic (Alkali) cleaning
A04	Flush rinsing
A05	Dip rinsing
A06	Spray rinsing
A07	Vapor degreasing
A08	Physical scraping and removal
A09	Clean out process equipment
A19	Other cleaning and degreasing
SURFACE PREPARATION AND FINISHING	
A21	Painting
A22	Electroplating
A23	Electroless plating
A24	Phosphating
A25	Heat treating
A26	Pickling
A27	Etching
A29	Other surface coating/preparation (Specify in Comments)
PROCESSES OTHER THAN SURFACE PREPARATION	
A31	Product rinsing
A32	Product filtering
A33	Product distillation
A34	Product solvent extraction
A35	By-product processing
A36	Spent catalyst removal
A37	Spent process liquids removal
A38	Tank sludge removal
A39	Slag removal
A40	Metal forming
A41	Plastics forming
A49	Other processes other than surface preparation (Specify in Comments)
PRODUCTION OR SERVICE DERIVED ONE-TIME AND INTERMITTENT PROCESSES	
A51	Leak collection
A53	Cleanup of spill residues
A54	Oil changes
A55	Filter/Battery replacement
A56	Discontinue use of process equipment
A57	Discarding off-spec material
A58	Discarding out-of-date products or chemicals
A59	Other production-derived one-time and intermittent processes
A60	Sludge removal
REMEDIATION DERIVED WASTE	
A61	Superfund Remedial Action
A62	Superfund Emergency Response
A63	RCRA Corrective Action at solid waste management unit
A64	RCRA closure of hazardous waste management unit
A65	Underground storage tank cleanup
A69	Other remediation
POLLUTION CONTROL OR WASTE TREATMENT PROCESSES	
A71	Filtering/screening
A72	Metals recovery
A73	Solvents recovery
A74	Incineration/Thermal treatment
A75	Wastewater treatment
A76	Sludge dewatering
A77	Stabilization
A78	Air pollution control devices
A79	Leachate collection
A89	Other pollution control or waste treatment
OTHER PROCESSES	
A91	Clothing and personal protective equipment
A92	Routine cleanup wastes (e.g., floor sweepings)
A93	Closure of management unit(s) or equipment other than by remediation specified in codes A61 - A69
A94	Laboratory wastes
A99	Other

FORM CODES

Code	Waste description

LAB PACKS - Lab packs of mixed wastes, chemicals, lab wastes

B001	Lab packs of old chemicals only
B002	Lab packs of debris only
B003	Mixed lab packs
B004	Lab packs containing acute hazardous wastes
B009	Other lab packs (Specify in Comments)

LIQUIDS

INORGANIC LIQUIDS - Waste that is primarily inorganic and highly fluid (e.g., aqueous), with low suspended inorganic solids and low organic content

B101	Aqueous waste with low solvents
B102	Aqueous waste with low other toxic organics
B103	Spent acid with metals
B104	Spent acid without metals
B105	Acidic aqueous waste
B106	Caustic solution with metals but no cyanides
B107	Caustic solution with metals and cyanides
B108	Caustic solution with cyanides but no metals
B109	Spent caustic
B110	Caustic aqueous waste
B111	Aqueous waste with reactive sulfides
B112	Aqueous waste with other reactives (e.g., explosives)
B113	Other aqueous waste with high dissolved solids
B114	Other aqueous waste with low dissolved solids
B115	Scrubber water
B116	Leachate
B117	Waste liquid mercury
B119	Other inorganic liquids (Specify in Comments)

ORGANIC LIQUIDS - Waste that is primarily organic and is highly fluid, with low inorganic solids content and low-to-moderate water content

B201	Concentrated solvent-water solution
B202	Halogenated (e.g., chlorinated) solvent
B203	Nonhalogenated solvent
B204	Halogenated/nonhalogenated solvent mixture
B205	Oil-water emulsion or mixture
B206	Waste oil
B207	Concentrated aqueous solution of other organics
B208	Concentrated phenolics
B209	Organic paint, ink, lacquer, or varnish
B210	Adhesives or epoxies
B211	Paint thinner or petroleum distillates
B212	Reactive or polymerizable organic liquid
B219	Other organic liquids (Specify in Comments)

SOLIDS

INORGANIC SOLIDS - Waste that is primarily inorganic and solid, with low organic content and low-to-moderate water content; not pumpable

B301	Soil contaminated with organics
B302	Soil contaminated with inorganics only
B303	Ash, slag, or other residue from incineration of wastes
B304	Other "dry" ash, slag, or thermal residue
B305	"Dry" lime or metal hydroxide solids chemically "fixed"
B306	"Dry" lime or metal hydroxide solids not "fixed"
B307	Metal scale, filings, or scrap
B308	Empty or crushed metal drums or containers
B309	Batteries or battery parts, casings, cores
B310	Spent solid filters or adsorbents
B311	Asbestos solids and debris
B312	Metal-cyanide salts/chemicals
B313	Reactive cyanide salts/chemicals
B314	Reactive sulfide salts/chemicals
B315	Other reactive salts/chemicals
B316	Other metal salts/chemicals
B319	Other waste inorganic solids (Specify in Comments)

ORGANIC SOLIDS - Waste that is primarily organic and solid, with low-to-moderate inorganic content and water content; not pumpable

B401	Halogenated pesticide solid
B402	Nonhalogenated pesticide solid
B403	Solid resins or polymerized organics
B404	Spent carbon
B405	Reactive organic solid
B406	Empty fiber or plastic containers
B407	Other halogenated organic solids (Specify in Comments)
B409	Other nonhalogenated organic solids (Specify in Comments)

FORM CODES

Code	Waste description

SLUDGES

INORGANIC SLUDGES - Waste that is primarily inorganic, with moderate-to-high water content and low organic content, and pumpable

B501	Lime sludge without metals
B502	Lime sludge with metals/metal hydroxide sludge
B503	Wastewater treatment sludge with toxic organics
B504	Other wastewater treatment sludge
B505	Untreated plating sludge without cyanides
B506	Untreated plating sludge with cyanides
B507	Other sludge with cyanides
B508	Sludge with reactive sulfides
B509	Sludge with other reactives
B510	Degreasing sludge with metal scale or filings
B511	Air pollution control device sludge (e.g., fly ash, wet scrubber sludge)
B512	Sediment or lagoon dragout contaminated with organics
B513	Sediment or lagoon dragout contaminated with inorganics only
B514	Drilling mud
B515	Asbestos slurry or sludge
B516	Chloride or other brine sludge
B519	Other inorganic sludges (Specify in Comments)

ORGANIC SLUDGES - Waste that is primarily organic with low-to-moderate inorganic solids content and water content, and pumpable

B601	Still bottoms of halogenated (e.g., chlorinated) solvents or other organic liquids
B602	Still bottoms of nonhalogenated solvents or other organic liquids
B603	Oily sludge
B604	Organic paint or ink sludge
B605	Reactive or polymerizable organics
B606	Resins, tars, or tarry sludge
B607	Biological treatment sludge
B608	Sewage or other untreated biological sludge
B609	Other organic sludges (Specify in Comments)

GASES

INORGANIC GASES - Waste that is primarily inorganic with a low organic content and is a gas at atmospheric pressure

B701	Inorganic gases

ORGANIC GASES - Waste that is primarily organic with low-to-moderate inorganic content and is a gas at atmospheric pressure

B801	Organic gases

SYSTEM TYPE CODES

Code	System Type
	METALS RECOVERY (FOR REUSE)
M011	High temperature metals recovery
M012	Retorting
M013	Secondary smelting
M014	Other metals recovery for reuse: e.g., ion exchange, reverse osmosis, acid leaching, etc. (Specify in Comments)
M019	Metals recovery - type unknown
	SOLVENTS RECOVERY
	nonsolvent organics recovery, etc. (Specify in Comments)
M039	Other recovery - type unknown
	INCINERATION
M041	Incineration - liquids
M042	Incineration - sludges
M043	Incineration - solids
M044	Incineration - gases
M049	Incineration - type unknown
	ENERGY RECOVERY (REUSE AS FUEL)
M051	Energy recovery - liquids
M052	Energy recovery - sludges
M053	Energy recovery - solids
M059	Energy recovery - type unknown
	FUEL BLENDING
M061	Fuel blending
	AQUEOUS INORGANIC TREATMENT
M071	Chrome reduction followed by chemical precipitation
M072	Cyanide destruction followed by chemical precipitation
M073	Cyanide destruction only
M074	Chemical oxidation followed by chemical precipitation
M075	Chemical oxidation only
M076	Wet air oxidation
M077	Chemical precipitation
M078	Other aqueous inorganic treatment: e.g., ion exchange, reverse osmosis, etc. (Specify in Comments)
M079	Aqueous inorganic treatment - type unknown
	AQUEOUS ORGANIC TREATMENT
M081	Biological treatment
M082	Carbon adsorption
M083	Air/steam stripping
M084	Wet air oxidation
M085	Other aqueous organic treatment (Specify in Comments)
M089	Aqueous organic treatment - type unknown
	AQUEOUS ORGANIC AND INORGANIC TREATMENT
M091	Chemical precipitation in combination with biological treatment
M092	Chemical precipitation in combination with carbon adsorption
M093	Wet air oxidation
M094	Other organic/inorganic treatment (Specify in Comments)
M099	Aqueous organic and inorganic treatment - type unknown
	SLUDGE TREATMENT
M101	Sludge dewatering
M102	Addition of excess lime
M103	Absorption/adsorption
M104	Solvent extraction
M109	Sludge treatment - type unknown
M021	Fractionation/distillation
M022	Thin film evaporation
M023	Solvent extraction
M024	Other solvent recovery (Specify in Comments)
M029	Solvents recovery - type unknown
	OTHER RECOVERY
M031	Acid regeneration
M032	Other recovery: e.g., waste oil recovery,

SYSTEM TYPE CODES

Code	System Type	Code	System Type

STABILIZATION

M111 Stabilization/Chemical fixation using cementitious and/or pozzolanic materials
M112 Other stabilization (Specify in Comments)
M119 Stabilization - type unknown

OTHER TREATMENT

M121 Neutralization only
M122 Evaporation only
M123 Settling/clarification only
M124 Phase separation (e.g., emulsion breaking, filtration) only
M125 Other treatment (Specify in Comments)
M129 Other treatment - type unknown

DISPOSAL

M131 Land treatment/application/farming
M132 Landfill
M133 Surface impoundment (to be closed as a landfill)
M134 Deepwell/underground injection
M135 Direct discharge to sewer/POTW (no prior treatment)
M136 Direct discharge to surface water under NPDES (no prior treatment)
M137 Other disposal (Specify in Comments)

TRANSFER FACILITY STORAGE

M141 Transfer facility storage, waste was shipped off site with no on-site TDR activity

Attachment E-2

RCRA Biennial Report System

QUANTITY CONVERSION AND NORMALIZATION

Biennial report quantities are reported and stored as a numeric quantity value with associated unit of measure information. When the unit of measure is volumetric (gallons, liters, or cubic yards) a density value and density unit of measure (pounds per gallon or specific gravity) are also stored.

Prior to performing arithmetic operations such as addition, reported quantities must be converted to a common unit of measure. This process is called quantity normalization. Most biennial report analysis uses English short tons as the common unit of measure. A short ton is equal to 2000 pounds.

The quantity normalization process used for non-volumetric quantities (pounds, short tons, kilograms or metric tons) is different than the process used to normalize volumetric quantities. Both processes are described below.

Quantities with non-volumetric units of measure (pounds, short tons, kilograms or metric tons) are normalized to short tons by multiplying the reported quantity value by a conversion factor. The conversion factors are determined by the unit of measure reported with the quantity and are provided in Table I below.

SOURCE: U.S. EPA, Office of Solid Waste, *Instruction Manual for the Biennial Reporting System (BRS) NTIS Data Tape*, April 1995.

Table I Short Tons Conversion Table. A Short Ton is equal to 2000 pounds.

When Unit of Measure is		Where: **Qv** = Quantity Value & **Sg** = Specific Gravity **The Short Tons (2000lb) Conversion formula is**
Pounds	(1)	Short Tons = **Qv** X 0.0005
Short Tons	(2)	Short Tons = **Qv** X 1
Kilograms	(3)	Short Tons = **Qv** X 0.001102499366063
Metric Tons	(4)	Short Tons = **Qv** X 1.102535832415
Gallons	(5)	Short Tons = **Qv** X **Sg** X 0.004170141784821
Liters	(6)	Short Tons = **Qv** X **Sg** X 0.001102499366063
Cubic Yards	(7)	Short Tons = **Qv** X **Sg** X 0.84

Reporters may report quantities using a variety of units of measure. Before performing arithmetic operations, quantities must be converted to a common unit of measure. EPA uses English Tons as the common unit of measure because the quantities of wastes reported total over in the hundreds of millions of tons.

Quantities with volumetric units of measure are normalized to short tons in a three step process. The first step of the process normalizes density to a common unit measure (specific gravity - sg). Density is normalized by multiplying the reported density value by a conversion factor. The conversion factor is determined by the density unit of measure reported with the density value. When the density unit of measure is pounds per gallon, the density value is multiplied by 0.1199040767386. When the density unit of measure is specific gravity, there is no conversion necessary. See Table II, below.

SOURCE: U.S. EPA, Office of Solid Waste, *Instruction Manual for the Biennial Reporting System (BRS) NTIS Data Tape*, April 1995.

Table II Density Conversion Table. A specific gravity of 1.0 equals 8.34 pounds per gallon.

When Density Unit of Measure is	Where:**Dv** = Density Value & **Sg** = Specific Gravity **The Specific Gravity Conversion formula is**
Pounds/Gallon (1)	**Sg** = **Dv** X 0.1199040767386
Specific Gravity(2)	**Sg** = **Dv** X 1

Reporters are allowed to report density in either pounds per gallon or specific gravity. Before performing aggregations of quantities, all densities should be converted to a common density measure.

The second step applies a range restriction to density. When the reported density is not within a range considered plausible, a density of water(1sg) is assigned. The plausible range includes solvents (0.40sg) at the lower and mercury (15.0sg) at the upper boundary. This step is optional, but should be applied when there is a desire to match EPA's calculations. See Table III, below.

Table III Density Adjustment Table. The specific gravity water is 1.0.

When Specific Gravity is	Where:**Dv** = Density Value & **Sg** = Specific Gravity **The Specific Gravity Adjustment formula is**
Sg<= 0.40 (Density < Solvents)	**Sg** = 1
Sg>=15.0 (Density > Mercury)	**Sg** = 1

Density adjustment assigns the density of water to wastes having a reported density that is outside of a range considered plausible.

The third step multiplies the quantity value, normalized density and a short tons conversion factor to produce the short ton equivalent. Again, the conversion factor is determined by the quantity unit of measure reported with the quantity value. The conversion factors are provided in Table I, above.

SOURCE: U.S. EPA, Office of Solid Waste, *Instruction Manual for the Biennial Reporting System (BRS) NTIS Data Tape*, April 1995.